

# PATENT ABSTRACTS OF JAPAN

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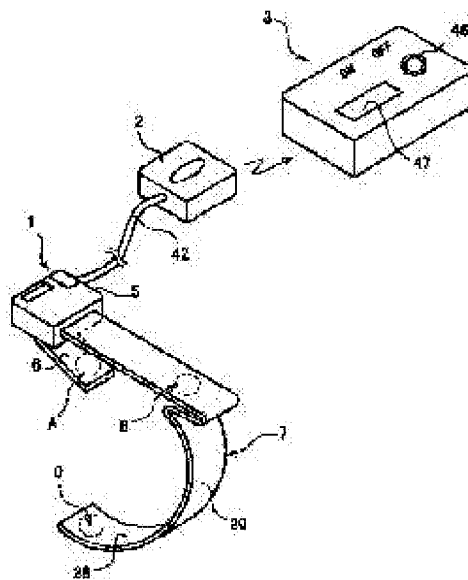
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## (54) ABNORMAL BODILY TEMPERATURE DETECTING SENSOR AND ITS REPORT SYSTEM

### (57)Abstract

**PROBLEM TO BE SOLVED:** To provide an abnormal bodily temperature detecting sensor which is small in size thin, and simple and detects abnormal bodily temperature, and which is attached to a person to be cared, and when it detects an abnormal bodily temperature, it is made to report to a caretaker about it by radio.

**SOLUTION:** The abnormal bodily temperature detecting sensor 6 which outputs an abnormal bodily temperature detecting signal if the bodily temperature detected by the temperature sensor is beyond a specified range of temperature, a status generating means which generates an abnormal bodily temperature alert based on the abnormal bodily temperature detecting signal from the abnormal bodily temperature detecting sensor 6, an discrimination number generating means which generates an intrinsic discrimination number, and a transmission means which transmits a transmission information comprising the abnormal bodily temperature alert and the discrimination number as a first radio wave, are provided to a transmitter 2. The first radio wave transmitted from the transmitter 2 is received, the discrimination number and the abnormal bodily temperature alert of the received transmission information are decoded by a decoding means, and the decoded discrimination number and the abnormal bodily temperature alert allow an acknowledgement means 47 to acknowledge an abnormal bodily temperature alert, which is contained in a receiver 3, to provide the abnormal bodily



temperature report system.

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CLAIMS

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[Claim(s)]

[Claim 1] An unusual body temperature detection sensor characterized by outputting an unusual body temperature detection signal when body temperature which has arranged a temperature sensor which detects temperature and was detected with this temperature sensor on a substrate is temperature other than a prescribed range.

[Claim 2] Body temperature which has arranged a contact sensor which detects contact with skin, and was detected with said temperature sensor on said substrate is temperature other than a prescribed range, and. The unusual body temperature detection sensor according to claim 1 characterized by outputting said unusual body temperature detection signal when contact with skin is detected by said contact sensor.

[Claim 3] An unusual body temperature informing system comprising:

An unusual body temperature detection sensor which outputs an unusual body temperature detection signal when body temperature detected with a temperature sensor is temperature other than a prescribed range.

A status generating means which generates an unusual body temperature alarm based on an unusual body temperature detection signal from this unusual body temperature detection sensor.

An identification number generating means which generates a peculiar identification number.

A transmitter possessing a dispatching means which sends transmit information which has an unusual body temperature alarm generated from said status generating means, and the identification number generated from said identification number generating means as the 1st electric wave, A receiver which has a reception means which receives said 1st electric wave sent from this transmitter, a decoding means which decodes said identification number and said unusual body temperature alarm of said transmit information received by this reception means, and a cognitive means to make an unusual body temperature alarm recognize based on this identification number and unusual body temperature alarm that were decoded.

[C laim 4]In the unusual body temperature informing system according to claim 3, receiving mode and dispatch mode are switched with a certain time interval, Said 1st electric wave sent from said transmitter at the time of receiving mode is received, An unusual body temperature informing system which is provided with a relay antenna device which sends said transmit information of the 1st electric wave received at the time of a transmitting mode to said receiver as the 2nd electric wave of the same frequency as this 1st electric wave, and is characterized by things.

[C laim 5]In the unusual body temperature informing system according to claim 4, said relay antenna device, When sending said transmit information of the 1st electric wave received by a transmitting mode to said receiver as the 2nd electric wave of the same frequency as this 1st electric wave, An unusual body temperature informing system which is provided with an antenna number adding means which adds an antenna number peculiar to said transmit information, decodes said antenna number in said decoding means of said receiver, and is characterized by things.

[C laim 6]An unusual body temperature informing system which said relay antenna device is provided with a telephone transfer processing means to transmit said unusual body temperature alarm based on said transmit information produced by receiving said 1st electric wave, in the unusual body temperature informing system according to claim 4, and is characterized by things.

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[T ranslation done.]

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the unusual body temperature informing system which sends with a transmitter, receives with a receiver and notifies the unusual body temperature detected by the unusual body temperature detection sensor which detects a person's looking after a patient unusual body temperature, and this unusual body temperature detection sensor to a person looking after a patient

[0002]

[Description of the Prior Art] In the hospital or the nursing home, a person's looking after a patient body temperature will be periodically measured several times in a thermometer on the 1st, and condition of disease and health condition are checked. If there is [normal temperature /, for example, a standard /\*\* / (a degree is called hereafter) /36 /, ] this measured body temperature within fixed limits, it can be judged that body temperature is normal and there is no change special to condition of disease or health condition. On the other hand, when body temperature is outside the fixed range, it can judge that it is unusual body temperature, and it is shown that the life of this state is in a dangerous situation. For example, since body temperature will not be 32 degrees or less and old body temperature will not usually be 38 degrees or more as long as human being has life activity, if body temperature will be 32 degrees or less and 38 degrees or more, it can be considered that a life is in a dangerous situation.

[0003]

[Problem(s) to be Solved by the Invention] By the way, in order to know the above unusual body temperature, the person looking after a patient had to measure the person's looking after a patient body temperature in the thermometer periodically, remarkable time and effort and labor were applied, and it was trouble.

[0004] Then, although a sick person is equipped with a thermometer and there is also a device which monitors body temperature for 24 hours in a hospital, since the device is large-scale and expensive, it is economically impossible to use such a device for the

person looking after a patient of being home. Since the thermometer and the monitoring device are always connected in code, a person's looking after a patient mental resistance is also strong, and a person looking after a patient tends to dislike attaching such a thermometer.

[0005] Since body temperature was usually measured in the thermometer and it had distinguished whether a person looking after a patient etc. were unusual body temperature from the measured value, when detecting unusual body temperature by the sensor which detects only unusual body temperature, and the unusual body temperature sensor, it asked for the system which notifies a person looking after a patient etc. of it automatically.

[0006] Then, the unusual body temperature detection sensor by which this invention detects unusual body temperature and whose thin shape it is small and is simple, It aims at providing the unusual body temperature informing system constituted so that a person looking after a patient might be told on radio, if a person looking after a patient was equipped with this unusual body temperature detection sensor and an unusual body temperature detection sensor detected unusual body temperature.

[0007]

[Means for Solving the Problem] An unusual body temperature detection sensor concerning this invention arranges a temperature sensor which detects temperature on a substrate, and when body temperature detected with this temperature sensor is temperature other than a prescribed range, it outputs an unusual body temperature detection signal.

[0008] Body temperature which has arranged a contact sensor which detects contact with skin, and was detected with said temperature sensor on said substrate is temperature other than a prescribed range, and an unusual body temperature detection sensor concerning this invention. When contact with skin is detected by said contact sensor, said unusual body temperature detection signal is outputted.

[0009] This invention is characterized by an unusual body temperature informing system comprising the following.

An unusual body temperature detection sensor which outputs an unusual body temperature detection signal when body temperature detected with a temperature sensor is temperature other than a prescribed range.

A status generating means which generates an unusual body temperature alarm based on an unusual body temperature detection signal from this unusual body temperature detection sensor.

An identification number generating means which generates a peculiar identification number.

A transmitter possessing a dispatching means which sends transmit information which has an unusual body temperature alarm generated from said status generating means, and the identification number generated from said identification number generating means as the 1st electric wave, A receiver which has a reception means which receives said 1st electric wave sent from this transmitter, a decoding means which decodes said identification

number and said unusual body temperature alarm of said transmit information received by this reception means, and a cognitive means to make an unusual body temperature alarm recognize based on this identification number and unusual body temperature alarm that were decoded.

[0010] An unusual body temperature informing system concerning this invention, Switch receiving mode and dispatch mode with a certain time interval, and said 1st electric wave sent from said transmitter at the time of receiving mode is received, It has a relay antenna device which sends said transmit information of the 1st electric wave received at the time of a transmitting mode to said receiver as the 2nd electric wave of the same frequency as this 1st electric wave.

[0011]

[Embodiment of the Invention] Hereafter, an example of the embodiment of the unusual body temperature detection sensor applied to this invention over a drawing and an unusual body temperature informing system is explained. Drawing 1 is a figure showing the outline composition of the person-looking-after-a-patient informing system which applied this invention. The sensor part 1 which the person-looking-after-a-patient informing system added the urine / facilities sensor 7 which detects urine/facilities to the unusual body temperature detection sensor 6 which detects the unusual body temperature of the person looking after a patient concerning this invention, and was attached, The transmitter 2 which sends the transmit information which consists of status information detected by this sensor part 1, such as unusual body temperature, urination, and defecation, and a peculiar identification number (an ID number is called hereafter) as an electric wave, The electric wave sent from this transmitter 2 is received, and outline composition is carried out from the receiver 3 which decodes the ID number and status information of said transmit information by the decoder which is a decoding means, and tells a person looking after a patient about the unusual body temperature based on the person-looking-after-a-patient name based on an ID number, and status information, urination, defecation, etc.

[0012] First, a sensor part is explained. Drawing 2 is a back view of a sensor part, and drawing 3 is the side view. As shown in drawing 2 and drawing 3, the sensor part 1 comprises the sensor clip 5, the unusual body temperature detection sensor 6, and the urine / facilities sensor 7. It is fixed to the sensor clip 5 and is [ sensor / 6 / unusual body temperature detection ] removable to the sensor clip 5 in urine / facilities sensor 7.

[0013] The top view and drawing 5 which drawing 4 shows an unusual body temperature detection sensor are the sectional side elevation. As shown in drawing 4 (a), sheet metal, such as silicone rubber which makes film state with an elongated shape, is used as the substrate 10, and integral moulding of an electric conduction pattern and the sensor is carried out by the mold on it. This electric conduction pattern consists of the strip lines 11, 12, 13, and 14 which extended to the longitudinal direction of the substrate 10 and by which were almost parallel and close arrangement was carried out, The temperature

detection sensors 16, such as a thermo sensitive register, are connected at the tip of the strip lines 11 and 12 of one couple, the electrodes 17a and 17b are connected at the tip of the strip lines 13 and 14 of the couple of another side, respectively, and the contact sensor 18 is constituted. This contact sensor 18 is for distinguishing the temperature detection sensor 16, if body temperature is detected, only when the unusual body temperature detection sensor 6 touches a person's looking after a patient body. When the contact sensor 18 touches the skin of the body, it is because the temperature detection sensor 16 is also considered to be in contact with skin. When this removes the unusual body temperature detection sensor 6 from the skin of the body, the temperature detection sensor 16 can be prevented from detecting outdoor air temperature as body temperature. And the unusual body temperature detection part A comprises the temperature detection sensor 16 and the contact sensor 18. As shown in drawing 4 (b), where the temperature detection sensor 16 and the contact sensor 18 of the unusual body temperature detection part A are exposed, the good nonwoven fabric 19 of the soft touch has pasted other portions. Thus, the unusual body temperature detection sensor 6 is formed (refer to drawing 5).

[0014] The abdomen of a human body has stable body temperature, is stabilized by intercepting the open air and detecting an abdominal temperature, and can detect body temperature. As long as human being has life activity, body temperature will not be 32 degrees or less, and even if care is a required old man's abdomen, the body temperature will not be 38 degrees or more. So, since a life will be considered to be in a very dangerous state if body temperature will be 32 degrees or less and 38 degrees or more, by this embodiment, body temperature will be 32 degrees or less and 38 degrees or more, and only when the contact sensor 18 moreover touches skin, an unusual body temperature alarm is sent from the transmitter 2.

[0015] moreover -- drawing 6 is a figure explaining the characteristic of temperature detection sensors, such as a thermo sensitive register of an unusual body temperature detection sensor, a horizontal axis is temperature and a vertical axis is resistance -- a characteristic curve -- a rise in heat -- it is shown that resistance decreases. If temperature (body temperature) is measured using the characteristic of this thermo sensitive register, temperature at the time of the resistance R 2 is made into 38 degrees for the temperature at the time of the resistance R 1 32 degrees, and resistance becomes more than R 1 or less than R 2, it will be considered that body temperature is 32 degrees or less or 38 degrees or more. Drawing 7 is a figure explaining to what kind of case an unusual body temperature detection signal is outputted, a horizontal axis is time, a vertical axis is temperature (body temperature), and change of the temperature (body temperature) accompanying progress of time is shown. If body temperature will be 38 degrees or more as are shown in drawing 7 (a), and an unusual body temperature detection signal is outputted and it is shown in drawing 7 (b), when body temperature will be 32 degrees or less, an unusual body temperature detection signal will be outputted.

[0016] As shown in drawing 4, after the contact sensor 18 has contacted skin, since current



weak as a conductor flows through skin between the electrode 17a and 17b, it is detectable that the unusual body temperature detection sensor 6 touches skin by this. A person looking after a patient removes the sensor part 1, if the unusual body temperature detection sensor 6 will be in the state where skin is not contacted, current will not flow between the electrode 17a of the contact sensor 18, and 17b, but thereby, if the unusual body temperature detection sensor 6 does not touch skin, it will be distinguished. Unusual body temperature detection is mentioned later for details.

[0017] Drawing 8 is a top view of urine / facilities sensor, and drawing 9 is the side section side. As shown in drawing 8 (a), elongated-shaped paper or thin plastic sheet is used as the substrate 20, and the water-repellent ink or the paste like silicon resin is applied on it. The electric conduction pattern is printed on the substrate 20 processed in this way. This electric conduction pattern consists of the 1st and 2nd almost parallel strip lines 21 and 22 that extended to the longitudinal direction of the substrate 20, and the 3rd short strip line 23 located in during this period. The tip end part of the 1st and 2nd strip lines 21 and 22 has the broad parts 21a and 22a which approached mutually, and are these broad parts 21a and 2. The facilities detection part C is constituted by 2a. Near the tip part 23a of the 3rd strip line 23, the height 22b protrudes from the flank in the middle of the 2nd strip line 22. The urine detection part B comprises the height 22b of the 2nd strip line 22 formed by separating the tip part 23a of this 3rd strip line 23, and a predetermined interval.

[0018] And as shown in drawing 8 (b), the terminal area 25 of the end of the substrate 20, the substrate center section 26 containing the urine detection part B, and the facilities detection part C are exposed, and print formation of the pattern 27 of water-repellent ink is carried out so that other portions may be covered. Thereby, urine can be prevented from permeating the portion of the pattern 27 of the substrate 20. As shown in drawing 8 (c), where the terminal area 25 is exposed, the good nonwoven fabric 28 of the soft touch has pasted other portions. The engagement hole 30 for engaging with the three engaging pins 33b which the sensor clip 5 mentions later is drilled in this terminal area 25 for every [ the strip lines 21 and 22 and ] 23. Thus, urine / facilities sensor 7 is formed (refer to drawing 9).

[0019] If between the tip part 23a of the 3rd strip line 23 of the urine detection part B and the height 22b of the 2nd strip line 22 flows by urination and current flows, A urine detection signal is outputted, and if between the broad part 21a of the 1st and 2nd strip lines 21 and 22 of the facilities detection part C and 22a flows by defecation and current flows, a facilities detection signal will be outputted.

[0020] Drawing 10 shows a sensor clip, (a) is the top view, (b) is the back view, and drawing 11 is a sectional side elevation showing the state of attaching the terminal area of urine / facilities sensor to a sensor clip. As shown in drawing 10 and drawing 11, the sensor clip 5 consists of the body part 32 and the covering device 33 pivoted in this body part 32 so that opening and closing were possible. The rear part 33a for opening the covering device 33 is formed in the surface of the covering device 33, and the three

engaging pins 33b which engage with the three engagement holes 30 of the terminal area 25 of urine / facilities sensor 7 turn caudad, and protrude on the opening E side of the rear face of the covering device 33.

[0021]The engagement groove 32a which engages with said three engaging pins 33b, respectively is engraved on the upper surface of the body part 32 of the sensor clip 5, and the long groove 32b for making the shorting bar 38 of the confirmation button 35 mentioned later almost in parallel with the opening E buried in the opening E side is engraved on it from the engagement groove 32a. The base end of the unusual body temperature detection sensor 6 is fixed to the rear face of the body part 32, and the button part 36 of the confirmation button 35 for checking whether urine / facilities sensor 7 has been certainly attached to the opening E side on the back is formed in the chamfer 32c. The body part 32 and the transmitter 2 are connected by the cable 42 which is a signal wire of the unusual body temperature detection sensor 6, and the urine / facilities sensor 7.

[0022]Drawing 12 is a perspective view showing a confirmation button, and the confirmation button 35 consists of the button part 36, the connector bar 37 by which one end was fixed to the button part 36, and the metal shorting bars 38 fixed to the other end of the connector bar 37. The spring 39 is provided contractingly by the connector bar 37 between the button part 36 and the shorting bar 38, and the shorting bar 38 is energized so that it may be buried in the long groove 32b, so that the head of the button part 36 may project in the chamfer 32c with the spring 39. Three projections 38a protrude on the shorting bar 38 with the prescribed interval.

[0023]And as shown in drawing 11, press down the rear part 33a of the covering device 33, and the opening of the covering device 33 is carried out. If turn the substrate 20 side up, the exposed portion of the terminal area 25 is turned down, urine / facilities sensor 7 is inserted so that the three engagement holes 30 of the terminal area 25 of urine / facilities sensor 7 may be located on the engagement groove 32a from the opening E side, respectively, and the covering device 33 is subsequently closed. The engaging pin 33b penetrates the engagement hole 30 of urine / facilities sensor 7, engages with the engagement groove 32a, does in this way, and sets urine / facilities sensor 7 to the sensor clip 5. Subsequently, if the energizing force of the spring 39 is resisted and the button part 36 is pushed in, the shorting bar 38 will march out from the long groove 32b. When three projections 38a make it short-circuit in contact with the strip lines 21, 22, and 23 of the terminal area 25 of urine / facilities sensor 7, the vibrating motor 64 which the receiver 3 mentions later is vibrated, and it checks that urine / facilities sensor 7 is certainly attached to the sensor clip 5.

[0024]Drawing 13 shows the transmitter, (a) is the front view and (b) is the back view. The face plate 41 which displays form etc. is stuck on the transverse plane of the transmitter 2, and the cable 42 is connected to the side. The person-looking-after-a-patient call button 43 for a person looking after a patient to call a person looking after a patient is formed in the

rear face of the transmitter 2, and the battery holder 44 for storing a cell is stored in the lower part

[0025] Drawing 14 shows a receiver, the electric power switch 45 is formed in the receiver 3 upper part, and LCD 47 which displays the kind etc. of the oscillating pause button 46 which makes the alarm by vibration halt, a person-looking-after-a-patient name, and alarm is provided in the transverse plane. The battery holder 48 for storing a cell is stored in the side of the receiver 3, and the key case 49 for hanging the receiver 3 to a person's looking after a patient belt etc. is connected with the other side.

[0026] Next, the state of equipping a person looking after a patient with a sensor part is explained with reference to drawing 1. The sensor part 1 is arranged inside the diaper cover which is not illustrated as opposed to a person's looking after a patient lumbar part. The unusual body temperature detection sensor 6 of the sensor part 1, and the urine / facilities sensor 7 are attached to the sensor clip 5, and is connected to the transmitter 2 via the cable 42. This transmitter 2 is attached to the outside surface of a diaper cover removable by the mounting means of a surface fastener etc. The unusual body temperature detection sensor 6 makes the nonwoven fabric 19 side contact an abdomen, and sticks the unusual body temperature detection part A to skin. With the contact sensor 18, the unusual body temperature detection part A detects carrying out adhesion contact to an abdominal skin, and measures an abdominal temperature with the temperature detection sensor 16. The unusual body temperature detection signal from the temperature detection sensor 16 and the detection signal of the skin contact from the contact sensor 18 are inputted and processed in the unusual body temperature sensor circuit 50 in the transmitter 2. The unusual body temperature sensor circuit 50 is mentioned later for details.

[0027] Urine / facilities sensor 7 sticks the nonwoven fabric 28 side at an abdomen, and locates the urine detection part B near a person's looking after a patient urination part. The facilities detection part C is located near a person's looking after a patient defecation part. Under the present circumstances, the urine detection part B is bent so that it may become near a person's looking after a patient urinating point, and a position is adjusted. If the urine detection part B is made close to a urinating point, a little urination will be detected, and it can avoid making it detect until urine will permeate to the part, if it separates from a urinating point. Since the facilities detection part C is independently with the urine detection part B, defecation and urination distinguish and are detected. The urine detection signal from the urine detection part B and the facilities detection signal from the facilities detection part C are inputted and processed in the urine / facilities sensor circuit 51 in the transmitter 2. Urine / facilities sensor circuit 51 is mentioned later for details.

[0028] Next, the various detection signals outputted from the sensor part are processed, and the flow of processing of the transmitter which sends the transmit information as an electric wave is explained. The transmitter 2 processes the various detection signals outputted from the sensor part 1, and it is provided also with the circuit (marker signal

continuation generation circuit 52 for wandering) which generates the marker signal for detecting old wandering. The marker signal continuation generation circuit 52 for wandering is mentioned later for details.

[0029] Drawing 15 is a block diagram of a sensor part and a transmitter, and the signal from the temperature detection sensor 16 of the sensor part 1 is inputted and processed in the unusual body temperature sensor circuit 50 of the transmitter 2. The signal from the contact sensor 18 is also inputted and processed in the unusual body temperature sensor circuit 50. When the unusual body temperature detection signal which shows 32 degrees or less or 38 degrees or more from the temperature detection sensor 16 of the unusual body temperature detection part A is outputted and the detection signal of skin contact is outputted from the contact sensor 18, an unusual body temperature alarm is outputted to the status generation circuit 53 from the unusual body temperature sensor circuit 50.

[0030] The signal from the urine detection part B of urine / facilities sensor 7 is inputted and processed in urine / facilities sensor circuit 51. Similarly, the signal from the facilities detection part C of urine / facilities sensor 7 is inputted and processed in urine / facilities sensor circuit 51. When a urine detection signal is outputted from the urine detection part B of urine / facilities sensor 7, When a urine detection alarm is outputted to the status generation circuit 53 from urine / facilities sensor circuit 51 and a facilities detection signal is outputted from the facilities detection part C of urine / facilities sensor 7, a facilities detection alarm is outputted to the status generation circuit 53 from urine / facilities sensor circuit 51. A push on the person-looking-after-a-patient call button 43 provided in the transmitter 2 will output the person-looking-after-a-patient call signals from the person-looking-after-a-patient call button 43 to the status generation circuit 53.

[0031] A marker signal is outputted to the status generation circuit 53 with a fixed time interval from the marker signal continuation generation circuit 52 for wandering. It is for this marker signal continuation generation circuit 52 for wandering detecting old wandering. If a marker signal is outputted to the status generation circuit 53 from the marker signal continuation generation circuit 52 for wandering, The status information of a marker signal is generated in the status generation circuit 53, The transmit information which consists of an ID number generated from this status information and the ID number generation circuit 54 is sent from the antenna 57 via the FSK (Frequency Shift Keying) modulation circuit 55 and the RF (Radio Frequency) transmitter 56 which are mentioned later, It is received by the receiver 3. Since the receiver 3 will receive the transmit information which consists of the status information and the ID number of a marker signal with a certain time interval if the transmitter 2 exists in the ready-for-receiving ability area of the receiver 3, the vibrating motor 64 which the receiver 3 mentions later in that case does not operate. Even if the transmitter 2 moves out of the ready-for-receiving ability area of the receiver 3 and the receiver 3 carries out specified time elapse, when the transmit information which consists of the status information and the ID number of a marker signal cannot be received, The vibrating motor 64 operates, and a wandering alarm is displayed by LCD 47 and a

wandering alarm is told.

[0032] And in the status generation circuit 53, when there is an unusual body temperature alarm, for example. That status information is generated, a peculiar ID number is generated and the transmit information which consists of this status information and ID number is outputted to the FSK (Frequency Shift Keying) modulation circuit 55 in the ID number generation circuit 54. In FSK modulation circuit 55, it becomes irregular to high frequency, the transmit information which consists of this status information and ID number is transmitted to the RF (Radio Frequency) transmitter 56, and an electric wave is sent via the antenna 57 from the RF transmitter 56.

[0033] Drawing 16 is a block diagram of a receiver end. The electric wave sent from the transmitter 2 is received by the RF receiver 61 via the antenna 60 of the receiver 3, Electricity is detected in the FSK detector circuit 62, and the ID number and status information of said transmit information are decoded by the decoder 63, and vibrate the vibrating motor 64 based on the various alarms of this status information, and. The kind of alarm based on the person-looking-after-a-patient name and status information based on an ID number, etc. are displayed on LCD 47. And the cognitive means 65 comprises the vibrating motor 64 and LCD 47. If it is considered as a cognitive means, a dial tone may be switched, or \*\* may be constituted so that the kind of alarm, etc. may be told by synthesized speech.

[0034] Vibration changes with kinds of alarm, for example, it vibrates succeeding the case where it is an unusual body temperature alarm. This vibration does not stop, unless a person looking after a patient turns off the electric power switch 45 of the receiver 3. In the case of a urine detection alarm, the vibration for about 0.2 second repeats at intervals of 7 to 8 seconds. It will halt, if a person looking after a patient pushes the oscillating pause button 46. The case of a facilities detection alarm, and when a facilities detection alarm and a urine detection alarm come out simultaneously, the vibration for about 0.5 second repeats at intervals of 3 to 5 seconds. If a person looking after a patient pushes the oscillating pause button 46, it will halt about 1 to 2 minutes. In the case of a person-looking-after-a-patient call alarm, the vibration for about 1 to 2 seconds repeats about 20 seconds. A person's looking after a patient transmitter 2 moves out of the ready-for-receiving ability area of the receiver 3, and, in the case of the wandering alarm emitted when the transmit information which consists of the status information and the ID number of a marker signal cannot be received, even if the receiver 3 carries out specified time elapse, it vibrates continuously. Thus, since vibration changes with kinds of alarm, the person looking after a patient can know the kind of alarm by the vibration.

[0035] Drawing 17 is a block diagram of a relay antenna device. When a person looking after a patient, for example, cares for two or more persons looking after a patient, the relay antenna device is required in order to make a reception range large. It is required when unusual body temperature etc. occur while the person's looking after a patient family went out, and connecting it to a relative, a person looking after a patient, a care center, etc.

[0036]The relay antenna device 67 by a synchronization or asynchronous to the signal which received receiving mode and dispatch mode A certain time interval, For example, switch at intervals of 10 to 20 seconds, and the electric wave (the 1st electric wave) sent from the transmitter 2 at the time of receiving mode is received, The ID number which is said transmit information of the 1st electric wave received at the time of a transmitting mode, and an antenna number peculiar to status information are added, and it amplifies as the 2nd electric wave of the same frequency as this 1st electric wave, and sends to the receiver 3.

[0037]First, in receiving mode, the transmit information of an electric wave which the electric wave sent from the transmitter 2 was received by the receive section 69 via the antenna 68 of the relay antenna device 67, and received is stored temporarily from the receive section 69 at the shift register 70. Time control of the shift register 70 is carried out with the clock 71, and he sends out said transmit information stored temporarily to the transmission section 72 after specified time elapse. Next, in dispatch mode, the antenna number from the antenna number additional circuit 73 is added to the transmit information sent by the shift register 70 in the transmission section 72, and it transmits from the antenna 68. Under the present circumstances, both the power supply 75 and the antenna 68 switch to the receive section 69 or the transmission section 72 at intervals of 10 to 20 seconds. By this, a power supply for exclusive use needs to be provided in the receive section 69 and transmission section 72 side, respectively.

[0038]The electric wave sent from the antenna 68 is received by the receiver 3. Under the present circumstances, the antenna number added in the antenna number additional circuit 73 is decoded by the decoder 63 of the receiver 3. This antenna number can be specified in the relay antenna device of which sickroom by specifying the relay antenna device 67, and decoding that antenna number with the receiver 3, for example, when a relay antenna device is formed for every sickroom of a hospital.

[0039]The shift register 70 is connected with the status information discrimination part 77. The status information discrimination part 77 is because it discriminates from status information, such as unusual body temperature, and discriminates from status information, for example with the pulse interval. The autodialer 78 is connected to the status information discrimination part 77. It is for the autodialer's 78 telephoning automatically telephone numbers registered beforehand, such as a person looking after a patient, a care center, and a relative, and switching a dial tone according to status information, or telling \*\* by synthesized speech. It telephones via a cellular phone /PHS 79 from the autodialer 78, or it connects with a dial-up line via the MODE M (modulator-demodulator) card 80, and telephones. The transceiver wave of various zones may be used simultaneously with the antenna 68.

[0040]Next, the concrete flow of an unusual body temperature alarm is explained. For example, the unusual body temperature detection signal which shows 32 degrees or less or 38 degrees or more from the temperature detection sensor 16 of the unusual body

temperature detection part A of the unusual body temperature detection sensor 6 of a person-looking-after-a-patient shell is outputted first. When the detection signal of skin contact is outputted from the contact sensor 18, an unusual body temperature alarm is outputted to the status generation circuit 53 from the unusual body temperature sensor circuit 50. In the status generation circuit 53, the status information of an unusual body temperature alarm is generated, an ID number peculiar in the ID number generation circuit 54 is generated, and the transmit information which consists of the status information and the ID number of this unusual body temperature alarm is outputted to FSK modulation circuit 55. In FSK modulation circuit 55, it becomes irregular to high frequency, this transmit information is transmitted to the RF transmitter 56, and an electric wave is sent via the antenna 57 from the RF transmitter 56.

[0041] And the electric wave sent from the transmitter 2 adds an antenna number to the transmit information which was received by the relay antenna device 67 and received with the relay antenna device 67, reinforces an electric wave, and transmits to a person's looking after a patient receiver 3. And it is received by the receiver 3, and the electric wave transmitted from the relay antenna device 67 decodes an ID number, status information (here unusual body temperature alarm), and an antenna number by the decoder 63 of a person's looking after a patient receiver 3, and carries out continuous vibration of the vibrating motor 64 based on an unusual body temperature alarm. A person looking after a patient recognizes an unusual body temperature alarm by the continuous vibration of the vibrating motor 64, and he can know the dispatch place based on the kind (here unusual body temperature alarm) of alarm based on the person-looking-after-a-patient name (here shell) and status information based on an ID number, and an antenna number, etc. by LCD 47.

[0042] On the other hand, the transmit information which consists of the ID number and status information from the shift register 70 of the relay antenna device 67 is inputted into the status information discrimination part 77. In this status information discrimination part 77, it discriminates from an unusual body temperature alarm from the status information of said transmit information, and telephone numbers beforehand registered by the autodialer 78, such as a person looking after a patient, a care center, and a relative, are telephoned automatically, a dial tone is switched or an unusual body temperature alarm is transmitted in synthesized speech. Thereby, a person-looking-after-a-patient informing system is extensible to a wide area.

[0043] Therefore, since an unusual body temperature detection sensor consists of a temperature detection sensor and a contact sensor, when an unusual body temperature detection sensor is removed from the skin of the body with a contact sensor, a temperature detection sensor can be prevented from detecting outdoor air temperature, and unusual body temperature can be detected certainly.

[0044] Since the peculiar ID number was attached for every individual transmitter, if there is two or more dispatch on the same area and the same frequency, it will interfere by the

conventional radio system, but such interference can be prevented. Since the status information according to an ID number and a detecting sensor also sends through radio, in a receiver end, a person's looking after a patient specification, pinpointing of a dispatch place, the kind of alarm, etc. can be known, and a person looking after a patient can cope with it promptly and appropriately to the person looking after a patient concerned according to the kind of alarm. With a relay antenna device, a person-looking-after-a-patient informing system can be extended to a wide area, and a person's looking after a patient behavior range can be extended, or many persons looking after a patient of large area can be cared for by one person looking after a patient

[0045] Since a relay antenna device switches receiving mode and dispatch mode with a certain time interval, it is not necessary to provide a power supply for exclusive use in the receive section 69 and transmission section 72 side, respectively, and power saving becomes possible. Telephones, such as a registered cellular phone, can be automatically told about the alarm according to kind by telephone transfer processing means, such as an autodialer of a relay antenna device. Since a relay antenna device adds and sends an antenna number, a relay antenna device can be specified by decoding an antenna number with a receiver.

[0046] Next, the sensor part of a 2nd embodiment is explained with reference to drawing 18. Sensor part 1' consists only of the unusual body temperature detection sensor 6, and there are not urine / facilities sensor 7, and the sensor clip 5, and transmitter 2' is connected with the unusual body temperature detection sensor 6 by the direct code 85, and it has become the same person-looking-after-a-patient informing system as a 1st embodiment of \*\*\*\* except it. Since sensor part 1' consists only of the unusual body temperature detection sensor 6, what is necessary is just to be able to stick the unusual body temperature detection sensor 6 at an abdomen directly, and it can be attached to trousers, a band, a diaper, etc. simple.

[0047] In the above-mentioned embodiment, although it was considered as an unusual body temperature alarm, the urine detection alarm, the facilities detection alarm, the wandering alarm, and the person-looking-after-a-patient call alarm as a kind of alarm of a person-looking-after-a-patient informing system, it is not necessarily limited to this and, of course, may be only an unusual body temperature alarm.

[0048] The unusual body temperature detection sensor presupposed that an unusual body temperature detection signal is outputted, when body temperature was 32 degrees or less and 38 degrees or more, but of course, an unusual body temperature detection signal may be outputted at the times of other temperature requirements, such as the time not only of this but 33 degrees or less and 39 degrees or more. Although it detected that the unusual body temperature detection part A touched the skin of the body with the contact sensor, it may be made to detect that the unusual body temperature detection part A touches the skin of the body not only with this but with the pressure sensor.

[0049] Although the unusual body temperature detection sensor, and the urine / facilities



sensor were used as the seat part, it is good also considering the portion which included the unusual body temperature sensor circuit, and the urine / facilities sensor circuit in this, respectively as an unusual body temperature detection sensor, and urine / facilities sensor. As for a relay antenna device, it is needless to say that it is not necessary to have the telephone transfer processing means of the status information discrimination part 77 and autodialer 78 grade.

[0050]

[Effect of the Invention] Since an unusual body temperature detection sensor consists of a temperature detection sensor and a contact sensor according to the unusual body temperature detection sensor concerning this invention as explained above, When an unusual body temperature detection sensor is removed from the skin of the body with a contact sensor, a temperature detection sensor can be prevented from detecting outdoor air temperature, and unusual body temperature can be detected certainly.

[0051] Since the peculiar identification number was attached for every individual transmitter, if there is two or more dispatch on the same area and the same frequency, it will interfere by the conventional radio system, but such interference can be prevented. Since the unusual body temperature alarm which are an identification number and status information is sent through radio, in a receiver end, a person's looking after a patient specification based on an identification number and an unusual body temperature alarm can be known, and a person looking after a patient can cope with it promptly and appropriately to the person looking after a patient concerned according to an unusual body temperature alarm. With a relay antenna device, an unusual body temperature informing system can be extended to a wide area, and a person's looking after a patient behavior range can be extended, or many persons looking after a patient of large area can be cared for by one person looking after a patient.

[0052] Since a relay antenna device switches receiving mode and dispatch mode with a certain time interval, it is not necessary to provide a power supply for exclusive use in the receive section [ of a relay antenna device ], and transmission section side, respectively, and power saving becomes possible. Since a relay antenna device adds and sends an antenna number to the transmit information which received from the transmitter, it can specify in which relay antenna device by decoding an antenna number by the decoding means of a receiver. By the telephone transfer processing means of a relay antenna device, a telephone can be transmitted automatically and an unusual body temperature alarm can be told.

\* NOTICES \*

**JO and INPT are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is an explanatory view showing the state of the outline composition of the person-looking-after-a-patient informing system which applied this invention being shown, and equipping a person looking after a patient with a sensor part

[Drawing 2] It is a back view of the sensor part concerning this invention.

[Drawing 3] It is a side view of the sensor part concerning this invention.

[Drawing 4] It is a top view of the unusual body temperature detection sensor concerning this invention.

[Drawing 5] It is a sectional side elevation of the unusual body temperature detection sensor concerning this invention.

[Drawing 6] It is a figure showing the characteristic of the temperature detection sensor of an unusual body temperature detection sensor.

[Drawing 7] With the figure explaining the output of an unusual body temperature detection signal, (a) shows the case where body temperature of (b) is 38 degrees or more, when body temperature is 32 degrees or less.

[Drawing 8] It is a top view of urine / facilities sensor.

[Drawing 9] It is a sectional side elevation of urine / facilities sensor.

[Drawing 10] A sensor clip is shown, (a) is the top view and (b) is the back view.

[Drawing 11] It is a sectional side elevation of a sensor clip.

[Drawing 12] It is a perspective view of a confirmation button.

[Drawing 13] A transmitter is shown, (a) is the front view and (b) is the back view.

[Drawing 14] It is a front view of a receiver.

[Drawing 15] It is a block diagram of a sensor part and a transmitter.

[Drawing 16] It is a block diagram of a receiver.

[Drawing 17] It is a block diagram of a relay antenna device.

[Drawing 18] It is an explanatory view showing the sensor part of a 2nd embodiment

[Description of Notations]

1 1'sensor part

2 2'transmitter  
3 Receiver  
5 Sensor clip  
6 Unusual body temperature detection sensor  
7 Urine / facilities sensor  
16 Temperature detection sensor  
17a and 17b Electrode  
18 Contact sensor  
21, 22, 23 strip lines  
25 Terminal area  
30 Engagement hole  
32 Body part  
33 Covering device  
35 Confirmation button  
38 Shorting bar  
43 Person-looking-after-a-patient call button  
46 Oscillating pause button  
47 LCD  
50 Unusual body temperature sensor circuit  
51 Urine / facilities sensor circuit  
52 The marker signal continuation generation circuit for wandering  
53 Status generation circuit  
54 ID number generation circuit  
63 Decoder (decoding means)  
64 Vibrating motor  
65 A cognitive means  
67 Relay antenna device  
70 Shift register  
73 Antenna number additional circuit  
78 Autodialer  
A Unusual body temperature detection part  
B Urine detection part  
C Facilities detection part

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[Translation done.]